

REX-D100 REX-D400 REX-D900



General Description

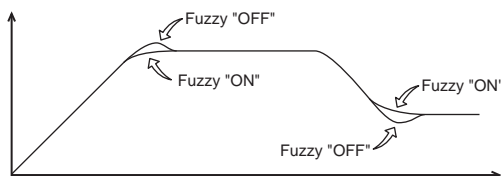
D Series controllers offer a wide range of standard features and optional functions to provide accurate control with fast response time. Designed to be easy to use, programming functions are easily accomplished through the front panel. Features such as advanced fuzzy logic, universal inputs/outputs, Heat/Cool PID control, reverse or direct action, process or deviation alarms, heater and loop break alarms, and digital communications make these instruments an excellent choice for temperature and process applications requiring tight control tolerances.

Features

- ☆ Advanced fuzzy logic
- ☆ Ramp-to-set point
- ☆ Universal inputs/outputs
- ☆ Analog retransmission output
- ☆ Dual set points
- ☆ Heater and loop break alarms
- ☆ D400/D900 IP54 Dustproof/Waterproof

Advanced Fuzzy Logic

The D Series features an advanced fuzzy logic algorithm that responds quickly to process upsets by suppressing and eliminating overshoot on startup or set point change.



Ramp-to-Set Point

The D Series has standard ramp-up and ramp-down to set point features for applications where extreme output changes can not be tolerated. This is a linear ramp in percent or degrees per minute.

Universal Inputs/Outputs

The D Series instruments offer a wide range of field configurable inputs. Choose from twelve different thermocouples, two RTDs or eight DC current inputs easily selected from the front panel.

The D Series also offers three different standard outputs. Relay, voltage pulse for SSR drive or 4-20mA DC outputs are field configurable eliminating the need for plug-in modules or soldered modifications.

Analog Retransmission Output

System performance is enhanced with the analog retransmission output. This feature allows the process value to be retransmitted as an analog current signal (4-20mA) to a remote instrument such as a recorder. Measured or set point value, deviation, manipulated output or current transformer input can be selected.

Dual Set Points

The D Series has two independent set points that are programmable from the front panel. SV1 or SV2 can be selected by using the contact input.

Optional Features

- Digital communications
- NEMA 4X - D100 only
- Heater and loop break alarm
- Heat/Cool PID control

Application-Specific Instrument

The D Series also offers the D100Z/900Z with a motor valve positioner without feedback resistance.

Digital Temperature Controller D Series



Specifications

Input

Input (Universal input)

- a) Thermocouple : K, J, R, S, B, E, T, N (JIS/IEC), PLII (NBS) W5Re/W26Re (ASTM), U, L (DIN)
 •Influence of external resistance : Approx. 0.4μV/Ω
 •Input break action : Up-scale
- b) RTD : Pt100 (JIS/IEC), JPt100 (JIS)
 •Influence of input lead : Approx. less than 10Ω
 •Input break action : Up-scale
- c) DC Low voltage input : 0 to 10mV, 0 to 100mV, 0 to 1V
 •Input break action : Up-scale
- d) DC High voltage input : 0 to 5V, 1 to 5V, 0 to 10V
 •Input break action : Down-scale
- e) DC current : 0 to 20mA, 4 to 20mA
 •Input break action : Down-scale
 •A 250Ω resistor is externally connected.

Sampling Time

0.5 sec

PV Bias

- Temperature input : -1999 (-199.9) to 9999 (999.9)°C [°F]
 DC voltage, DC current : -1999 to 9999 (A decimal point position is the same as that of PV.)

Performance

Measuring Accuracy

- ± (0.3% of span + 1 digit)
 Cold-junction temperature compensation error
 Within ±1.5°C (between 0 and 50°C [32 and 122°F])
 •Accuracy is not guaranteed between 0 and 400°C (0 and 752°F) for type B input.
 •Accuracy is not guaranteed between 0 and 32°F for type N, PLII and W5Re/W26Re.

Insulation Resistance

- More than 20MΩ (500V DC) between input terminals and ground
 More than 20MΩ (500V DC) between power terminals and ground

Dielectric Strength

- 1000V AC for one minute between input terminals and ground
 1500V AC for one minute between power terminals and ground

Control

Control Method

- a) PID control with autotuning and fuzzy logic
 b) Heat/Cool PID control with autotuning and fuzzy logic

Major Setting Range

- Setting range : Same as input range.
 Heat-side proportional band : 1(0.1) to setting limit high. (ON/OFF action when P=0)
 Cool-side proportional band : 1 to 3000% of heat-side proportional band (Heat/Cool ON/OFF action when Pc=0)
 Integral time : 1 to 3600sec.(P + D action when I=0)
 Derivative time : 1 to 3600sec.(P + I action when D=0)
 Deadband/Overlap : -10 (-10.0) to 10 (10.0)°C (°F)
 -10.0 to 10.0% of span (Voltage, current input)
 Proportional cycle time : 1 to 100 sec.
 Output limiter High : -5.0 to +105.0%
 Output limiter Low : -5.0 to +105.0%
 Manual control : -5.0 to +105.0%
 (Heat/Cool control type : -105.0 to +105.0%)

Control Output

- Relay output : Form C contact, 250V AC 3A (resistive load) (Form A contact : D100)
- Voltage pulse output : 0/12V (Load resistance :More than 600Ω)
 •OUT1 of D400/D900 : 0/15V DC (Load resistance :More than 1kΩ)
- Current output : 0 to 20mA, 4 to 20mA DC (Load resistance :Less than 600Ω)
- Continuous voltage output : 0 to 5V, 0 to 10V, 1 to 5V DC (Load resistance :More than 1kΩ)

Combination of Output and Type

Output	Type	YES: Available NO : Not available	
	D100 Specify when ordering	D400/900 (OUT1) Universal output	D400/900 (OUT2) Specify when ordering
Relay contact	YES	YES	YES
Voltage pulse	YES	YES	YES
Current	YES	YES	YES
Continuous voltage	YES	NO	YES

Alarms

Temperature Alarm

- a) Number of alarms : 2 points
 b) Alarm action : Programmable (process, deviation, SV, FAIL)
 c) Alarm differential gap : -10 (-10.0) to 10 (10.0)
 d) Alarm delay : 0 to 600 sec.

Control Loop Break Alarm

- a) LBA time setting : 0 to 7200 sec. (LBA OFF by setting Zero)
 b) LBA deadband : 0 to 9999°C [°F] or 100% of span (OFF by setting zero)
 •Output from ALM1 terminal OR output with temperature alarm is available.
 •Not available for heat/cool control type.

Heater Break Alarm (Optional)

- a) Number of inputs : 1 or 2 points.(2 points for 3-phase heater)
 b) CT type : CTL-6-P-N (30A), CTL-12-S56-10L-N (100A)
 c) Display range : 0.0 to 100.0A (OFF by setting Zero)
 d) Accuracy : ± 5% of input value or 2A (whichever is larger)
 •Output from ALM2 terminal OR output with temperature alarm is available.

Alarm Output

- Relay output, Form A contact 250V AC 0.5A (resistive load)

Options

External Contact Input

- Number of inputs : 1 point
 Type : SV1/SV2 selection (Open : SV1, Close : SV2)
 •REX-D400/900: Standard function, REX-D100: Optional function

Analog Output

- a) Number of outputs : 1 point
 b) Output signal : 0 to 5V, 0 to 10V, 1 to 5V DC (Load resistance : More than 1kΩ)
 0 to 20mA, 4 to 20mA DC (Load resistance : Less than 600Ω)
 •Output data can be selected among process value, deviation, set point, manipulated output value (Heat-side or Cool-side), current transformer input (With HBA function).

Digital Communications

- a) Communication method : RS-485 (2-wire), RS-422A(4-wire)
 b) Communication speed : 1200, 2400, 4800, 9600, 19200 bps
 c) Bit format
 Start bit : 1
 Data bit : 7 or 8
 Parity bit : Without, Odd or Even
 Stop bit : 1 or 2
 d) Communication code : ASCII(JIS) 7-bit code

General Specifications

Supply Voltage

- a) 90 to 264V AC (Including supply voltage variation) [Rating : 100 to 240V AC] (50/60Hz common)
 b) 21.6 to 26.4V AC (Including supply voltage variation) [Rating : 24V AC] (50/60Hz common)
 c) 21.6 to 26.4V DC (Ripple rate 10% p-p or less) [Rating : 24V DC]

Power Consumption

- D100 : Less than 11VA (100 to 240V AC)
 Less than 7.0VA (24V AC)
 Less than 180mA (24V DC)
- D400/900 : Less than 12VA (100 to 240V AC)
 Less than 7.5VA (24V AC)
 Less than 200mA (24V DC)

Power Failure Effect

- A power failure of 20 msec or less will not affect the control action.

Operating Environments : 0 to 50°C [32 to 122°F] , 20 to 80% RH

Memory Backup :

- Backed up by EEPROM.
 Number of writing : Approx. 100,000 times

Net Weight

- D100 : Approx. 180g
 D400 : Approx. 250g
 D900 : Approx. 360g

External Dimensions (W x H x D)

- D100 : 48 x 48 x 100mm
 D400 : 48 x 96 x 100mm
 D900 : 96 x 96 x 100mm



Digital Temperature Controller D Series



Model and Suffix Code

REX-D100

Specifications	Model and Suffix Code																							
Model	D100 (1/16 DIN size)											<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Control method ²	PID control with AT Heat/Cool PID with AT											F	W											
Control output (OUT1)	Relay output Voltage pulse DC mA, V (See Output Signal Code Table)											M	V											
Control output (OUT2)	No output (control method F) Relay output Voltage pulse DC mA, V (See Output Signal Code Table)											N	M	V										
Alarms	No alarm Two alarms																			N	D			
Heater break alarm(HBA) ^{1,3}	Not supplied Single-phase heater break alarm Three-phase heater break alarm																				N	S	D	
Contact input (STEP) ¹	Not supplied STEP function (Select SV1/SV2)																				N	1		
Analog output ¹	Not supplied See Output Signal Code Table (Output Signal Code 4-8)																					N		
Digital communications ¹	Not supplied RS-485 (2-wire system)																					N	5	
Waterproof/Dustproof (NEMA 4X)	Not supplied Waterproof/Dustproof protection																						N	1

¹ One function can be selected from contact input analog output, three-phase heater break alarm and digital communication.

² If the Heat/Cool PID control with AT is selected, contact input, analog output, three-phase heater break alarm or digital communication can not be added.

³ If continuous voltage/current output is specified, heater break alarm can not be added.

• For CE Mark and UL/cUL Approved products, add the suffix of "CE" to the end of the model code.

REX-D400/900

Specifications	Model and Suffix Code																							
Model	D400 (1/8 DIN size) D900 (1/4 DIN size)											<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Control method ^{1,2}	PID control with AT Heat/Cool PID with AT											F	W											
Control output (OUT2)	No output (control method F) Relay output Voltage pulse DC mA, V (See Output Signal Code Table)											N	M	V										
Alarms	No alarm Two alarms																			N	D			
Heater break alarm(HBA) /STEP function	Not supplied (with STEP function) Single-phase heater break alarm (with STEP function) Three-phase heater break alarm (without STEP function)																				N	S	D	
Analog output ^{1,2}	Not supplied See Output Signal Code Table																					N		
Digital communications ²	Not supplied RS-422A (4-wire system) RS-485 (2-wire system)																						N	4
																							N	5

¹ If the Heat/Cool PID control with AT is selected, analog output can not be added.

² If the Heat/Cool PID control with AT or analog output is selected, RS-485 digital communications should be selected.

³ If continuous voltage/current output is specified, heater break alarm can not be added.

• For CE Mark and UL/cUL Approved products, add the suffix of "CE" to the end of the model code.

Range and Input Table

Thermocouple (Field-programmable)

Input	Range	Input	Range
K	-199.9 – 999.9 °C	B	0 – 1820 °C
	-200 – 1372 °C		0 – 3308 °F
	-199.9 – 999.9 °F	E	-200 – 1000 °C
	-330 – 2500 °F		-330 – 1832 °F
J	-199.9 – 999.9 °C	N	0 – 1300 °C
	-200 – 1200 °C		0 – 2372 °F
	-199.9 – 999.9 °F	PLII	0 – 1390 °C
-330 – 2192 °F	0 – 2534 °F		
T	-199.9 – 400.0 °C	W5Re	0 – 2320 °C
	-199.9 – 752.0 °F	/W26Re	0 – 4208 °F
R	0 – 1769 °C	U	0 – 600 °C
	0 – 3216 °F		0 – 1100 °F
S	0 – 1769 °C	L	0 – 900 °C
	0 – 3216 °F		0 – 1600 °F

RTD (Field-programmable)

Input	Range
JPt100	-199.9 – 510.0 °C
	-199.9 – 950.0 °F
Pt100	-199.9 – 660.0 °C
	-199.9 – 999.9 °F

Voltage and Current (Field-programmable)

Input	Range
0 - 10mV	Scale range and decimal point are programmable in the range of -1999 to 9999
0 - 100mV	
0 - 1V	
0 - 5V	
1 - 5V	
0 - 10V	
0 - 20mA ¹	
4 - 20mA ²	

Current input

¹ For "0 - 20mA DC" input, a 250 Ω resistor (±0.02% ±10PPM, more than 0.25W) is necessary to be connected externally to "0 - 5 V DC" input.

² For "4 - 20mA DC" input, a 250 Ω resistor (±0.02% ±10PPM, more than 0.25W) is necessary to be connected externally to "1 - 5 V DC" input.

Output Signal Code Table

4	0 - 5V DC	5	0 - 10V DC	6	1 - 5V DC	7	0 - 20mA DC	8	4 - 20mA DC
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Accessory

Shunt resistor for DC current input
KD100-55

Supply Voltage

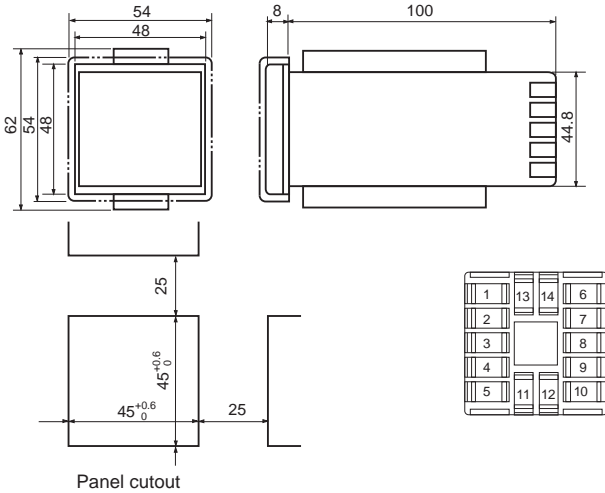
100 - 240V AC	24V AC	24V DC
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Digital Temperature Controller D Series

External Dimensions and Rear Terminals

REX-D100

Unit : mm



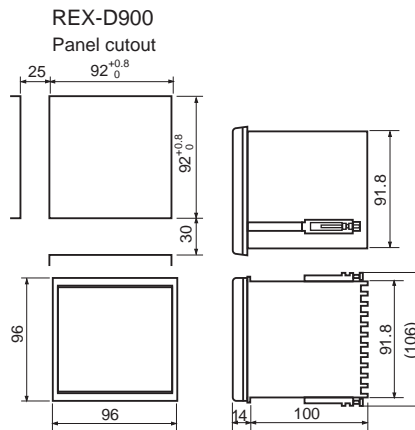
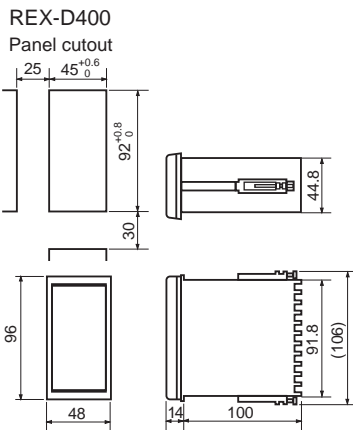
No.	Description	No.	Description
1	Alarm output	6	AC 100 to 240V
2	Relay contact output	7	AC 24V
3	Alarm 2	8	DC 24V
4	Control output 1	9	Measured input (1) TC input (2) RTD input (3) Voltage/Current input
5	(1) Relay contact output (2) Voltage/Current	10	
13	Control output 2	13	(1) TC input
14	(1) Relay contact output (2) Voltage/Current	14	(2) RTD input
	Analog output		(3) Voltage/Current input
	Current transformer input 2		
	Communications		
	Contact input		
11	Current transformer input 1		
12			

* Double-dotted line shows the front cover conforming to NEMA 4X.
The panel thickness must be 1 to 10 mm.

REX-D400

Unit : mm

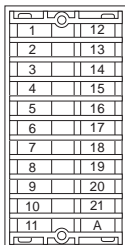
REX-D900



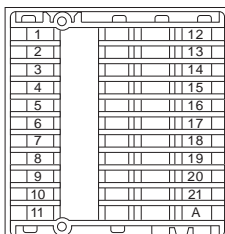
* The panel thickness must be 1 to 8 mm.

* The panel thickness must be 1 to 8 mm.

REX-D400



REX-D900



No.	Description	No.	Description
1	AC 100 to 240V	12	Control output 1
2	AC 24V	13	Voltage/current
3	DC 24V	14	Control output 2
4		15	
5		16	(2) Voltage/Current
6		17	
7	Alarm 1	18	
8	Alarm 2	19	Current transformer input 2
9	Measured input	20	
10	(1) TC input	21	Current transformer input 1
11	(2) RTD input		
	(3) Voltage/Current input		